REMARKS

The Applicants thank the Examiner for the careful examination of this application. Claims 17 - 21 are pending and rejected.

Claim 17 positively recites pre-amorphizing a first layer of the semiconductor crystal adjacent the surface. Claim 17 also positively recites implanting a second layer of the substrate adjacent the surface with a temporary impurity atom. These advantageously claimed features are not taught or suggested by the patents granted to Chu et al., Thompson et al., or Downey, or the publication of Lee; either alone or in combination.

Chu et al. does not teach the advantageously claimed invention because Chu et al. does not teach implanting a second layer of the substrate adjacent the surface with a temporary impurity atom (column 8 lines 52-66).

The Applicants respectfully traverse the assertion in the Office Action (page 2) that Chu et al. teaches the step of pre-amorphizing a first layer of the semiconductor crystal adjacent the surface. The Applicants submit that Chu et al. teaches away from the advantageously claimed invention because Chu et al. teaches that the crystal should not be amorphized and even suggests how it can be avoided (column 4 lines 58-59).

The Applicants also respectfully traverse the assertion in the Office Action (page 2) that Chu et al. teaches the advantageously claimed step of heating to re-grow the semiconductor crystal within the first layer. The Applicants note that they are not just claiming a generic re-crystallization of the silicon layer, as asserted in the Office Action (page 2). In addition, the Applicants note that they are not claiming a generic heat treatment. Rather, the Applicants claim heating to re-grow the semiconductor crystal within the pre-amorphized layer whereby the temporary dopant becomes incorporated into the crystal matrix. The Applicants submit that this advantageously claimed step is not taught by Chu et al. in the cited sections; specifically, column 4 lines 60-67 (an implant step – not a heating step "after implanting" as claimed), column 5 line 48 (annealing of target dopant), column 7 lines 20-24 (annealing of target dopant), column 6 lines 20-30 (annealing of target dopant).

Thompson et al. (like Chu et al., as discussed above) does not teach the advantageously claimed invention because Thompson et al. does not teach implanting a second layer of the substrate adjacent the surface with a temporary impurity atom (column 4 lines 36-37).

In addition, Thompson et al. (like Chu et al., as discussed above) teaches away from the advantageously claimed invention because Thompson et al. teaches that the crystal should not be amorphized (column 1 lines 33-37).

Furthermore, Thompson et al. (like Chu et al., as discussed above) does not teach heating to re-grow the semiconductor crystal within the pre-amorphized layer whereby the temporary dopant becomes incorporated into the crystal matrix, as advantageously claimed.

Therefore, combining Thompson et al. with Chu et al. does not teach the advantageously claimed invention.

Downey does not teach the advantageously claimed invention because Downey does not teach pre-amorphizing a first layer of the semiconductor crystal adjacent the surface (column 5 lines 58-63, FIG. 2). Therefore, Downey (like Thompson et al. and Chu et al., as discussed above) does not teach heating to re-grow the semiconductor crystal within the pre-amorphized layer, as advantageously claimed.

Therefore, combining Downey with Thompson et al. and Chu et al. does not teach the advantageously claimed invention.

In addition, Downey does not teach the advantageously claimed invention because Downey does not teach forming a target dopant layer. Rather, Downey teaches that the dopant is implanted into the substrate (column 2 lines 51-52, column 4 lines 49-51, column 6 lines 4-5).

Regarding Claim 18, Chu et al. does not teach that, except where the target dopant layer functions as a spacer layer, forming a spacer layer comprising a spacer material over the target dopant layer (column 8 lines 52-66). Moreover, Chu et al does not teach that prior to annealing the target dopant layer is etched, and optionally the spacer layer is etched, to form spacers (column 8 lines 52-66). Similarly, Downey does not teach forming a spacer layer comprising a spacer material over the target dopant layer and etching the spacer layer to form spacers (column 6 lines 4-7, FIG. 2).

Regarding Claim 19, Chu et al. does not teach that the target dopant layer functions as a spacer layer (column 8 lines 52-66). Similarly, Downey does not teach that the target dopant layer functions as a spacer layer (column 6 lines 4-7, FIG. 2).

Regarding Claim 20, Chu et al. does not teach that the gate layer comprises a high-k dielectric (column 8 lines 52-66). Similarly, Thompson et al. does not teach that the gate layer comprises a high-k dielectric (column 3 lines

11-13; see also page 5 of the Office Action). In addition, Downey does not teach that the gate layer comprises a high-k dielectric (FIGS. 1-2). The Applicants agree that Lee teaches the use of a high-k dielectric gate layer. However, Claim 20 is dependent on Claim 17 and therefore includes the limitations of Claim 17. Lee does not teach pre-amorphizing a first layer of the semiconductor crystal adjacent the surface. Rather, Lee teaches that pre-amorphization is problematic (paragraphs 0005 and 0008-0009). Therefore, Lee (like Downey, Thompson et al. and Chu et al., as discussed above) does not teach heating to re-grow the semiconductor crystal within the pre-amorphized layer, as advantageously claimed.

Regarding Claim 21, Chu et al. does not teach that the second layer adjacent the substrate surface is within the first layer (column 8 lines 52-66). Similarly, Thompson et al. does not teach that the second layer adjacent the substrate surface is within the first layer (column 4 lines 36-38, FIGS. 5-7). In addition, Downey does not teach that the second layer adjacent the substrate surface is within the first layer (column 5 lines 18-23).

Therefore, the Applicants respectfully traverse the Examiner's rejection of Claim 17 and respectfully assert that Claim 17 is patentable over the patents granted to Chu et al., Thompson et al., and Downey, and the publication of Lee; either alone or in combination. Furthermore, Claims 18-21 are allowable for depending on allowable independent Claim 17 and, in combination, including limitations not taught or described in the references of record.

For the reasons stated above, this application is believed to be in condition for allowance. Reexamination and reconsideration is requested.

Respectfully submitted,

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